other one related to the problem of galvanic corrosion between aluminum and carbon.

[0011] WO2012/142129-A1 describes an electric cable with an external insulating coating, and containing a cable core and a plurality of conductive elements surrounding the cable core. The cable core is made of composite material.

[0012] As known, there is a substantial difference between an electric cable and an electric conductor. A "cable" refers to a means for electric energy transmission equipped with an external insulating coating. A "conductor" refers to a means for electric energy transmission, the application and operation of which do not require it to be externally insulated.

[0013] Above a certain operating voltage value, the layer of material necessary for ensuring proper cable insulation would have to become so thick as to make the cable difficult to install. Therefore, the cable described in WO2012/142129-A1 is not suitable for use within the scope of the present invention, which concerns a "bare" overhead conductor, i.e. without external insulation.

[0014] Composite materials, such as those mentioned in WO2012/142129-A1, are obtained by combining materials of different classes to obtain new or improved properties, compared to those of the original materials. A composite is therefore a heterogeneous material made up of distinct phases, which can be separated from each other. In its simplest version, it consists of a discontinuous phase (reinforcement) scattered into a continuous phase (matrix). The task of the matrix is to protect and support the reinforcement, holding it in its original position, and to evenly transfer thereto any external stresses. The reinforcement can thus express its physical and mechanical properties, thereby improving the characteristics of the matrix. For this synergic effect between matrix and support to adequately develop, it is necessary that good contact is established there between through a process of impregnating the reinforcement with the matrix, and that such contact is maintained even in the presence of high external mechanical stresses; this latter requirement can be expressed as good adhesion between phases.

[0015] Conductors with a composite core, as in WO2012/142129-A1, are provided with a reinforcement of carbon fibre and a matrix of epoxy resin (ACCC). However, the matrix implies some constraints in terms of flexibility, thermal expansion, operating temperature, and an increase in the weight of the conductor, so that these cables are not suitable for use within the frame of the present invention.

[0016] KR2012-0018473-A describes an electric conductor with an aramidic reinforcement, the sheath of which only performs the function of preventing water and moisture from damaging the fibres of the aramidic reinforcement. The problem left unsolved by this patent is preventing UV rays from hitting the aramidic fibres, which, as known, undergo significant degradation when exposed to such radiations.

[0017] KR2012-0018872-A describes an electric conductor with a multi-wire core, wherein every single wire of said core is coated with an aluminum tube, the thickness of which is between 0.05 and 0.25 mm. Such a thin tube can be easily damaged during the subsequent processing steps and during conductor installation. On the other hand, if a thicker tube were employed in order to overcome this problem, this would imply a higher strain due to the thermal expansion of the tube, which, if compared with the negative thermal expansion coefficient of aramidic fibres, would imply an extra length of the tube with respect to the fibres, which would not be negligible at all, if we consider that normal conductor lengths range from a few hundreds of metres to some kilometers, thus worsening the thermal expansion characteristics of the whole conductor. Moreover, a metallic coating would offer poor resistance to the mechanical phenomenon of fatigue, as well as low elasticity.

SUMMARY OF THE INVENTION

[0018] The present invention, therefore, aims at providing a conductor for bare overhead electric lines which overcomes the above-mentioned drawbacks, and which has the required physical-mechanical characteristics.

[0019] It is one object of the invention to provide a conductor for bare overhead electric lines which can transport high electric power, in particular compared to traditional conductors of the same size (i.e. outside diameter) and the same total mass.

[0020] The invention further aims at providing a conductor for bare overhead electric lines which has adequate physical and mechanical characteristics, having properties such as:

- **[0021]** adequate rigidity, thus not undergoing excessive deformation during installation and in operation, and not requiring excessive pretensioning;
- **[0022]** good breaking strength, so as to be able to withstand the initial pretensioning and to support the conductor weight throughout its life;
- **[0023]** good thermal resistance, both static and dynamic, so as to be able to withstand the thermal cycles caused by electric losses;
- **[0024]** very good creep resistance, resulting in reduced elongation in operation, which shall be less than 1% throughout the conductor's life;
- **[0025]** low thermal expansion coefficient, for limiting the elongation of the cable should the operating temperature rise;
- **[0026]** good fatigue strength, because of oscillations caused by the wind. This is particularly important if the geometry of the cross-section has not been specially designed for this purpose.

[0027] The basic idea of the present invention is to provide the conductor for electric lines with a load-bearing core comprising aramidic fibres, as a solution to the above-mentioned problems, which have been known for a long time but have not yet been effectively solved. As set out in claim **1**, the present invention relates to a conductor for bare overhead electric lines, which comprises a load-bearing core on which conducting means for electric energy transportation are arranged, characterized in that said load-bearing core comprises a plurality of aligned aramidic fibres defining one or more ropes wrapped in one or more sheaths.

[0028] Preferably, the aramidic fibres are made of Kevlar® or Twaron® or Zylon®.

[0029] Preferably, the sheaths are made of thermoplastic material.

[0030] The present invention solves the problems suffered by prior-art solutions of electric conductors in terms of flexibility, thermal expansion, operating temperature, while not increasing the conductor's weight. In addition, the aramidic fibres of the conductor of the present invention, since they do not suffer from fragility, can be used without requiring a support matrix, thereby eliminating the constraints that conductors fitted with a reinforcement of composite material are subject to.